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An Efficient Routing Approach to Improve the Performance of IoT Node for 5G Communication Applications

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ABSTRACT: 5G will be quickly become the new standard for cellular networks. The Internet of Things (IoT) is rapidly developing and expanding. This research explored numerous investigations identified with routing protocols. According to the examination finished, various multicast routing protocol is applied in the node to node simulation scenario. This paper presents an efficient routing approach to improve the performance of IOT node for 5G communication applications. Simulation is done using MATLAB software.

KEYWORDS: 5G, IOT, MATLAB, Node, Simulation, Protocol, Routing.

I. INTRODUCTION

The most numerous type of device in the IoT can be referred to as the node. These are all the exciting devices that are providing sensor data, or devices that are being controlled from the cloud. This means things like door locks, security sensors, temperature sensors, and more. The Internet of things (IoT) portrays actual articles (or gatherings of such items) that are inserted with sensors, handling capacity, programming, and different advances that associate and trade information with different gadgets and frameworks over the Internet or different interchanges organizations.

The field has advanced because of the combination of different innovations, including universal processing, product sensors, progressively strong inserted frameworks, and machine learning.[1] Traditional fields of installed frameworks, remote sensor organizations, control frameworks, robotization (counting home and building mechanization), freely and all things considered empower the Internet of things.

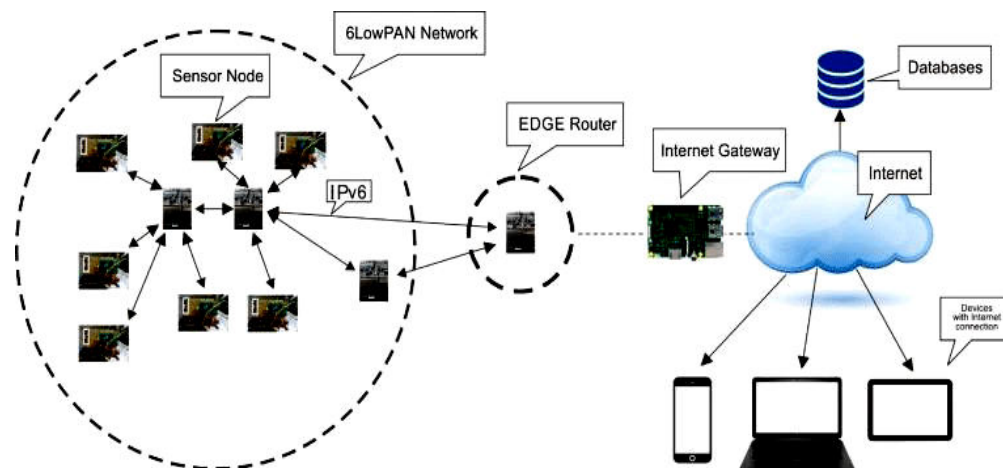


Figure 1: IOT network

In the consumer market, IoT innovation is generally inseparable from items relating to the idea of the "shrewd home", including gadgets and apparatuses (like lighting installations, indoor regulators, home security frameworks and cameras, and other home machines) that help one or more normal biological systems, and can be controlled by means of gadgets related with that environment, for example, cell phones and brilliant speakers. The IoT can likewise be utilized in medical care systems.[5]

There are various worries about the dangers in the development of IoT advancements and items, particularly in the space of protection and security, and thusly, industry and administrative moves to address these worries have started, including the improvement of global and nearby norms, rules, and administrative systems.

II. METHODOLOGY

The proposed research work methodology is based on the following steps-

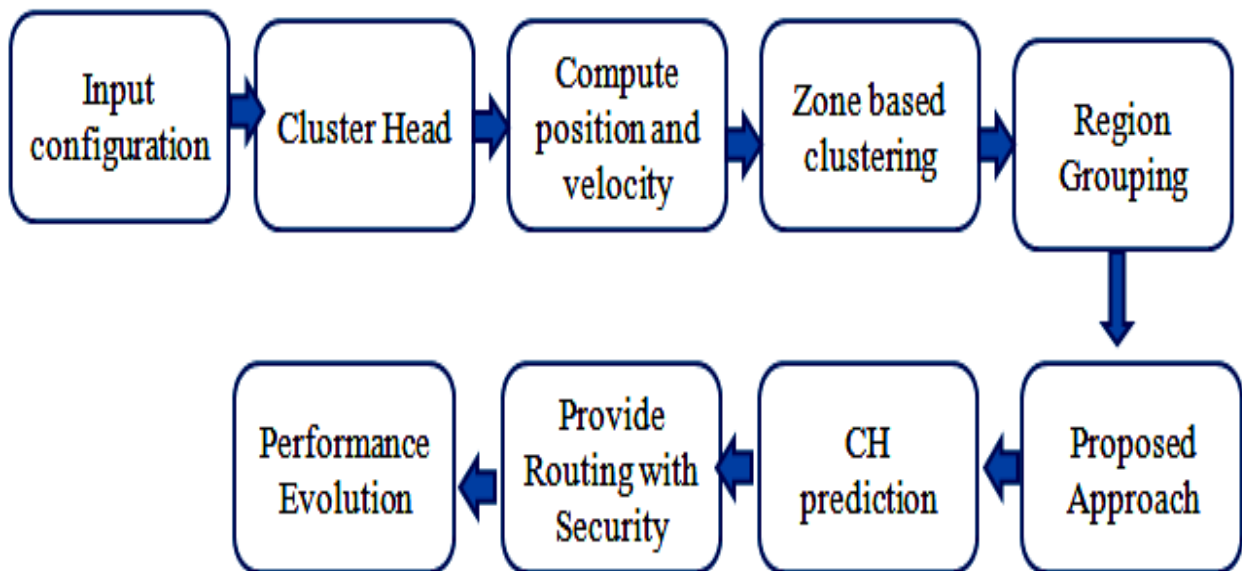


Figure 2: Flow Chart

Flow Chart Steps-

- First, select CH made by clustering Algorithm.
- After k-time zone update & validate of CH also important.
- For creation of this model, apply Neuro-Fuzzy prediction method.
- At first fuzzy based membership function will be created we have to Gaussian –bell shape membership function is used for more information.
- For efficient creation of rules, Neuro-fuzzy model based training sample acquired by initial clustering Algorithm.
- In Neuro-Fuzzy given i/p for node position [X,Y], Velocity Buffer size of node.
- A self learning mechanism is nothing but the fuzzy rules are created by initial clustering algorithm.
- So don't need any additional training Neuro-Fuzzy easily turning depend upon initial condition nodes.
- Based on training data fuzzy rules create and updated.



III. SIMULATION RESULTS

The implementation of the proposed algorithm is done over MATLAB 9.4.0.813654 (R2018a). The signal processing and communication toolbox helps us to use the various functions available in MATLAB Library.

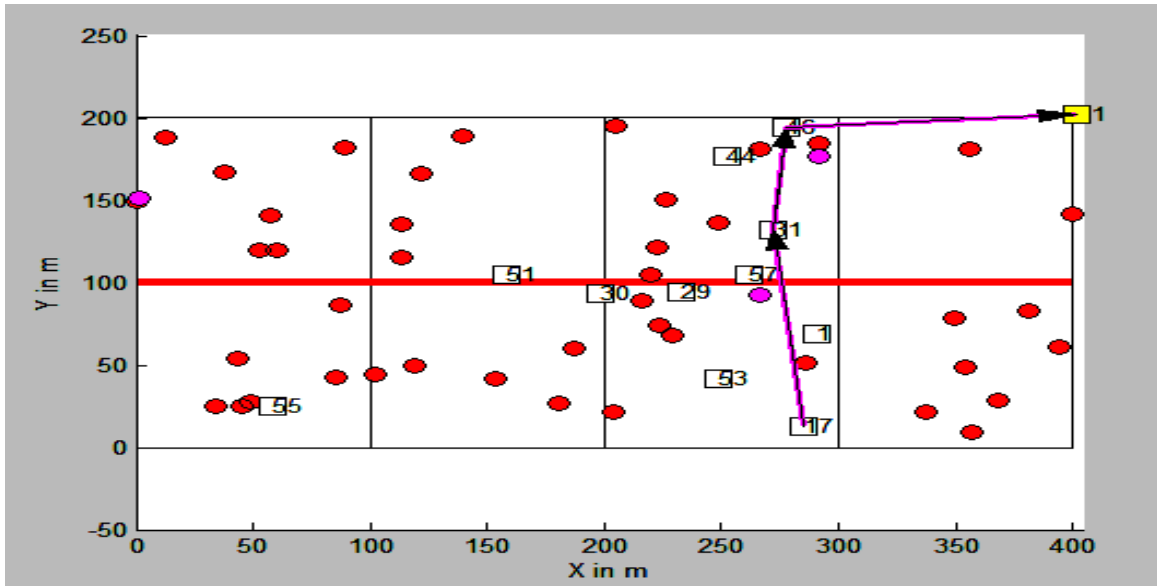


Figure 3: Route Creation

In the figure 3, after t – time slots, Here also use 60 nodes with different velocity of nodes white node as cluster Head updated by Neuro- Fuzzy. The routing path shows in magenta color.

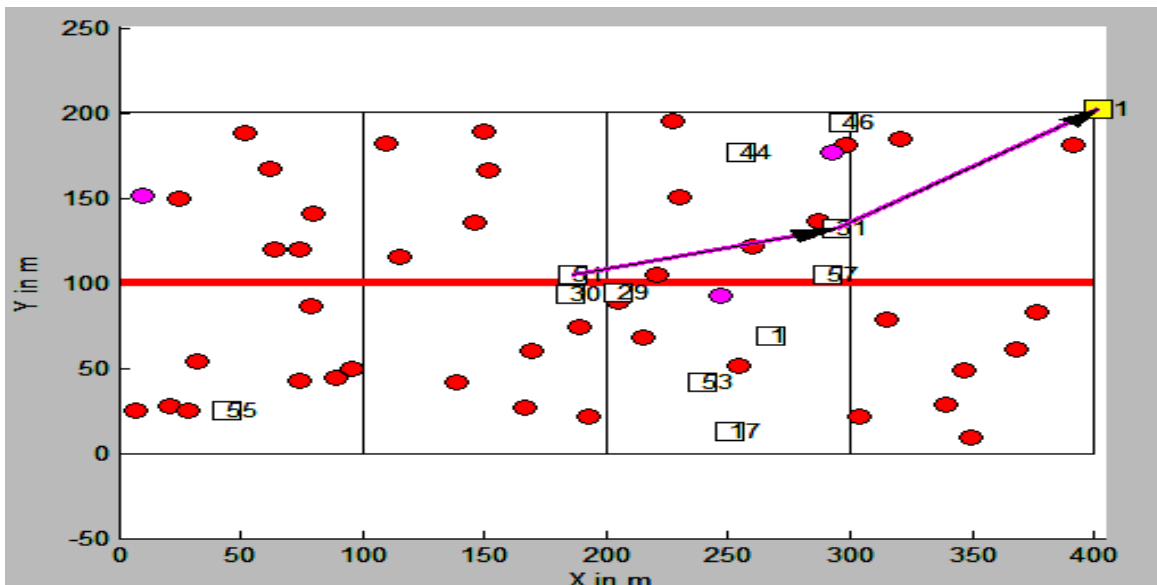


Figure 4: Route update

In Fig 4 Totally we have 60 nodes to show, the cluster Head change due to node high mobility. The mobility of nodes CH selects and update in each zone by using Neuro-Prediction method. The find routing path also displayed.

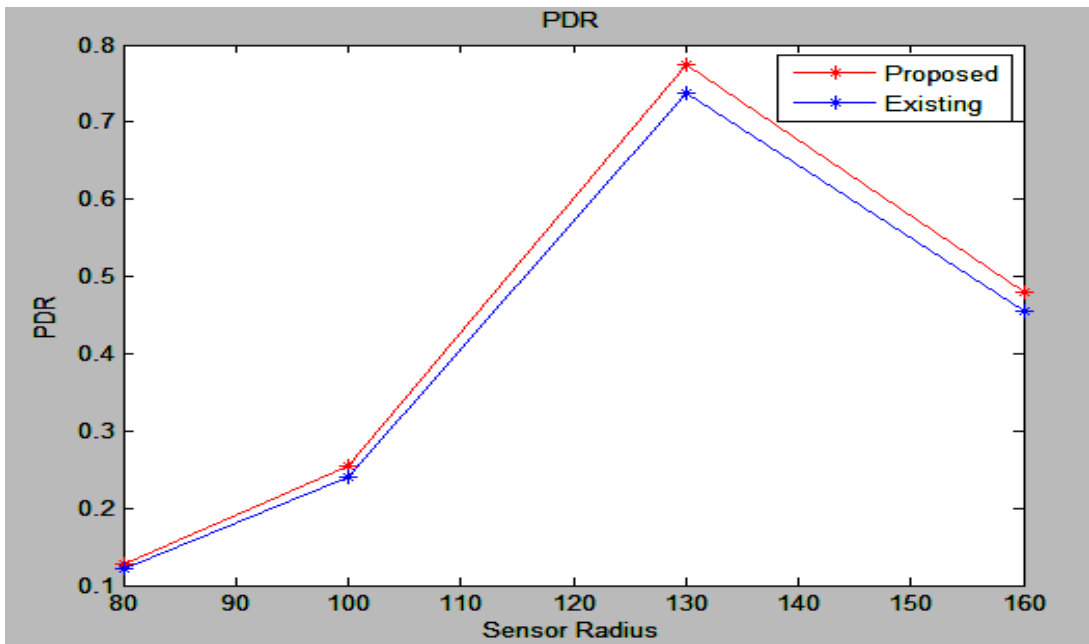


Figure 5: Packet delivery ratio

The figure 5 compares the Packet Delivery Ratio (PDR) with sensor Radius. If the sensor radius is low, the communication path breakage maybe happen, so it's automatically reduce the PDR if sensor.

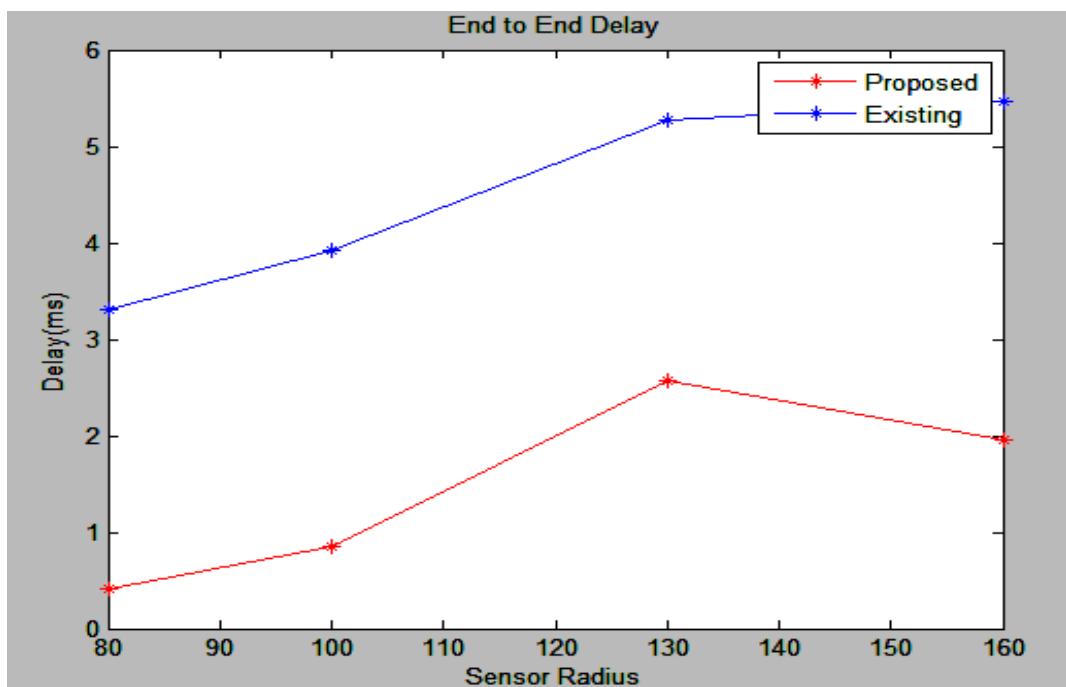


Figure 6: End to End delay

Figure 6 presents the End to End delay; it varies based on sensor radius. The sensor Radius in low value, the path breakage may ne happen.

Table 1: Result Comparison

| Sr. No | Parameters | Previous Work | Proposed Work |
|--------|-----------------------|-------------------|------------------|
| 1 | Method | Adaptive Approach | Neuro-Fuzzy |
| 2 | Delay | 0.01 Sec | 0.003 Sec |
| 3 | Packet Delivery Ratio | 55% | 80% |
| 4 | Energy | 0.3J | 0.1 J |
| 5 | No of nodes | 100 | 100 |
| 6 | Simulation Time | 4 minutes 39 sec | 2 minutes 20 sec |

IV. CONCLUSION

This research presents an efficient routing approach to improve the performance of IOT node for 5G communication applications. Achieved end to end delay is 0.003 sec while previously it is 0.01Sec. The total no of nodes is considered 100. The total simulation time is 2 minutes 20 sec while previously it is 4 minutes 39 sec. The energy consumption by the node is 0.1J in proposed while it is 0.3J in previous. Therefore it can be said that proposed work giving better results than previous work.

REFERENCES

- [1] H. Hellaoui, M. Koudil and A. Bouabdallah, "Energy Efficiency in Security of 5G-Based IoT: An End-to-End Adaptive Approach," in IEEE Internet of Things Journal, vol. 7, no. 7, pp. 6589-6602, July 2020, doi: 10.1109/IJOT.2020.2974618.
- [2] T. M. Hewa, A. Kalla, A. Nag, M. E. Ylianttila and M. Liyanage, "Blockchain for 5G and IoT: Opportunities and Challenges," 2020 IEEE Eighth International Conference on Communications and Networking (ComNet), 2020, pp. 1-8, doi: 10.1109/ComNet47917.2020.9306082.
- [3] A. Narayanan et al., "Key Advances in Pervasive Edge Computing for Industrial Internet of Things in 5G and Beyond," in IEEE Access, vol. 8, pp. 206734-206754, 2020, doi: 10.1109/ACCESS.2020.3037717.
- [4] J. Zhang, H. Liu and L. Ni, "A Secure Energy-Saving Communication and Encrypted Storage Model Based on RC4 for EHR," in IEEE Access, vol. 8, pp. 38995-39012, 2020, doi: 10.1109/ACCESS.2020.2975208.
- [5] M. Poongodi, V. Vijayakumar, F. Al-Turjman, M. Hamdi and M. Ma, "Intrusion Prevention System for DDoS Attack on IOT With reCAPTCHA Controller Using Information Based Metrics," in IEEE Access, vol. 7, pp. 158481-158491, 2019, doi: 10.1109/ACCESS.2019.2945682.
- [6] A. Nguyen, V. Nhan Vo, C. So-In, D. Ha, S. Sanguanpong and Z. A. Baig, "On Secure Wireless Sensor Networks With Cooperative Energy Harvesting Relaying," in IEEE Access, vol. 7, pp. 139212-139225, 2019, doi: 10.1109/ACCESS.2019.2941915.
- [7] A. Ahad, M. Tahir and K. -L. A. Yau, "5G-Based Smart Healthcare Network: Architecture, Taxonomy, Challenges and Future Research Directions," in IEEE Access, vol. 7, pp. 100747-100762, 2019, doi: 10.1109/ACCESS.2019.2930628.
- [8] Ovidiu Vermesan; Joël Bacquet "End-to-end Security and Privacy by Design for AHA-IoT Applications and Services," in Next Generation Internet of Things Distributed Intelligence at the Edge and Human Machine-to-Machine Cooperation , River Publishers, 2018, pp.103-138.
- [9] Ovidiu Vermesan; Joël Bacquet "Use Cases, Applications and Implementation Aspects for IoT Interoperability," in Next Generation Internet of Things Distributed Intelligence at the Edge and Human Machine-to-Machine Cooperation , River Publishers, 2018, pp.139-174.
- [10] Ovidiu Vermesan; Joël Bacquet "Next Generation Internet of Things Distributed Intelligence at the Edge and Human Machine-to-Machine Cooperation," in Next Generation Internet of Things Distributed Intelligence at the Edge and Human Machine-to-Machine Cooperation , River Publishers, 2018, pp.i-xxiv.



- [11] Ovidiu Vermesan; Joël Bacquet "IoT European Security and Privacy Projects: Integration, Architectures and Interoperability," in Next Generation Internet of Things Distributed Intelligence at the Edge and Human Machine-to-Machine Cooperation , River Publishers, 2018, pp.207-292.
- [12] X. Shao, C. Yang, D. Chen, N. Zhao and F. R. Yu, "Dynamic IoT Device Clustering and Energy Management With Hybrid NOMA Systems," in IEEE Transactions on Industrial Informatics, vol. 14, no. 10, pp. 4622-4630, Oct. 2018, doi: 10.1109/TII.2018.2856776.



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